

REMARKS

Claims 1-7 and 27-33 are pending in the present Application. Claims 5 and 31 are canceled.

Claims 1 and 27 have been amended to limit the one or more conductive polymers to being only selected from polyacetylenes, polyanilines, polypyrroles, polythiophenes and graphite. This is supported by the Specification at page 5, lines 3-22.

Claims 1-4, 6, 7, 27-30, 32 and 33 have been rejected under 35 USC § 103(a) as being unpatentable over Chen (US 6,277,263) in combination with Rapoport et al. (US 5,298,687) further in combination with Applicant's admitted state of the art. Applicant respectfully traverses.

The Chen patent is directed to a method of depositing copper, particularly a method of enhancing a copper seed layer using a metal plating bath, more specifically an alkaline copper electroplating bath. This patent clearly teaches that an ultra thin seed layer can be used if it is combined with a subsequent *electrochemical* seed layer enhancement technique. See column 6, lines 5-7. Chen only teaches enhancing a seed layer by electroplating. This teaching is clearly supported throughout the patent. Nothing in the Chen patent teaches or suggests a non-electrochemical technique of enhancing a seed layer. In particular, the use of a conductive polymer to enhance a seed layer is neither taught nor suggested by Chen.

Rapoport et al. disclose a hybrid electrical connection having a crossover connection between circuit patterns on a ceramic substrate. The crossover connection in this patent is a *copper-filled* or *silver-filled* polymer. See column 4, lines 50-54. It is the metal filling that provides the conductivity in these polymers. Nothing in this patent teaches or suggests the use of polymers that are conductive without such metal filling. The conductive polymer films of Rapoport et al. are approximately $20 \mu\text{m}$ thick, see column 6, lines 14-16. Such a thick layer is over 100 times the thickness of Applicants' seed layer. Nothing in this patent teaches or suggests that significantly thinner, i.e., 100 times thinner, can be used.

Applicant's invention is directed to depositing a seed layer or enhancing a discontinuous seed layer by use of a conductive polymer to provide a seed layer having a thickness of 50 to 1500 angstroms wherein the conductive polymers are selected from the group consisting of polyacetylenes, polyanilines, polypyrroles, polythiophenes and graphite. The Specification clearly recites that these polymers are themselves conductive. In fact, such polymers are known to be conductive without the use of metal fillers, such as copper and silver.

One skilled in the art would have no motivation to combine Rapoport et al. with Chen. As described above, Chen is directed only to enhancing seed layers using an electrochemical technique and by depositing only a metal or metal alloy. No other methods are disclosed or suggested by Chen. Nothing in Chen would lead one skilled in the art to substitute a polymer for such metal or metal alloy nor to use a non-electrochemical technique to enhance a seed layer. Even if one did look to Rapoport, this patent only discloses metal (i.e. silver or copper) filled polymers and neither teaches nor suggests Applicant's specifically claimed conductive polymers. Nothing in these references alone or in combination discloses or suggests Applicant's claimed invention. Applicant submits that the Examiner has not made out a *prima facie* case of obviousness and respectfully requests that this rejection be withdrawn.

Claims 5 and 31 have been rejected under 35 USC § 103(a) as being unpatentable over Chen (US 6,277,263) in combination with Rapoport et al. (US 5,298,687) further in view of Applicant's admitted state of the art and still further in view of Jonas (US 6,358,437) or Cloots (US 6,340,496). Applicant respectfully traverses.

The Chen and Rapoport patents are discussed above, both individually and in combination. As discussed above, nothing in Rapoport teaches or suggests Applicant's claimed conductive polymers. Further, nothing in Rapoport teaches or suggests films that are 100 times thinner than metal-filled polymer films of Rapoport. In fact, Rapoport only teaches metal-filled polymers.

Neither Jonas et al. nor Cloots et al. fill the deficiencies of Chen, Rapoport or a combination of these references. The Jonas and Cloots patents only disclose certain polymers none of which are metal-filled. Nothing in these patents teach or suggest the use of such conductive polymers in the manufacture of integrated circuits. Further, nothing in these patents

teach or suggest the use of such conductive polymers to deposit or repair a seed layer, particularly on a substrate having $\leq 1 \mu\text{m}$ apertures.

As discussed above, one skilled in the art would have no motivation to combine Rapoport et al. with Chen. Chen is only directed to the *electrochemical* enhancement of seed layers with a *metal or metal alloy*. The Chen patent would not lead one skilled in the art to substitute a polymer for such metal or metal alloy or to use a non-electrochemical technique of seed layer enhancement. The Rapoport patent is directed to the use of copper-filled or silver-filled polymers that are far thicker than the dimensions of the apertures used in integrated circuit manufacture. Nothing in Rapoport teaches or suggests the use of a conductive polymer that does not contain a metal filler. Further, nothing in this patent teaches or suggests the specific conductive polymers claimed by Applicant. None of the polymers in Jonas and/or Cloots are metal-filled. Rapoport only teaches metal-filled polymers. Thus, there is nothing in any of these references that would lead one skilled in the art to combine them. The Jonas and/or Cloots references add nothing to Chen and/or Rapoport. There is nothing in the Chen, Rapoport, Jonas or Cloots references, individually or in any combination that would fairly suggest Applicant's claimed invention. Applicant respectfully submits that the Examiner has not made out a *prima facie* case of obviousness and respectfully requests that this rejection be withdrawn.

In view of the foregoing, Applicants respectfully request favorable reconsideration in the form of a notice of allowance.

Respectfully submitted,



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